

Cells and Chemical Changes

Summary

The generic (universal) cell and its functions and involvement in chemical changes illustrates life processes.

Main Core Tie

Food and Science

[Strand 6](#)

Background for Teachers

The Essence of the Universal Cell - All living organisms, large and small, have one thing in common--the cell. Each cell is a collection of living matter enclosed by a barrier, a cell wall, that separates the cell from its surroundings. Each cell is a tiny living factory capable of converting simple food substances into energy and new cell material and of reproducing itself. Most cells, whether in an onion or a child, perform the functions we associate with life.

Each person began life as a single cell. That cell divided and became two and then four. The four became eight, and so on until a person's body (at about 12 years of age) contains about 30 trillion cells. (See transparency AMOEBA DIVIDING.)

An amoeba is a single-cell animal and the way it grows and divides illustrates the way all cells grow and divide. First the nucleus divides into two nuclei then the cell itself divides into two cells with a nucleus in each one.

Whenever cells are injured, by cuts or bruises for example, they must be repaired. Body cells also wear out when attacked by germs and infections. Cells use chemicals to carry on growth and repair. New cells are made faster than old cells are lost, but growth and repair cannot take place unless body cells are provided with the chemicals they need and those chemicals come from the food people eat and drink.

Intended Learning Outcomes

Understanding the cell as a fundamental unit in all plants and animals is basic to an understanding of chemical changes within the cells of living entities, including the human body and plant and animal food sources for humans.

Instructional Procedures

See attachments below:

The students will participate in PREASSESSMENT. They will answer and reflect upon questions about onions and food preparation. Correct answers will underscore awareness of the self-contained units called cells that make up all living things.

The students will MAKE A CELL MODEL following directions given by the teacher.

The students will make or obtain slides of onion cells that have been stained with iodine or another dye. (Use caution: Remember Iodine is a poison.) The slides should be viewed at low and at high magnification on a microscope so that students can compare resulting brightness and detail.

The teacher may show samples of slides found on the CELL MAGNIFICATION transparency.

The teacher will ask the following questions about the microscope:

How does a microscope help us tell when something is or has been alive?

What are the limitations of a microscope in identifying life?

Using the SCIENTIFIC PREFIX/SUFFIX TERMS chart provided, the students will determine the meaning of the following terms: cytology, biology, protoplasm, and exoderm.

The students can also synthesize words from the chart, such as osteoporosis and homeostasis. As the teacher demonstrates, the students will observe RAPID AND SLOW OXIDATION and discuss the results. The students will practice using the scientific method. Before participating in the experiments, students should read sections in their texts that specifically describe the conditions necessary for the cause/prevention of enzymatic browning in fruit. The students or teacher can perform the experiment during which students observe, generalize, theorize, and test on the worksheet ENZYMATIC BROWNING EXPERIMENT. During a class discussion of student responses, volunteers will diagram and explain their models on the board.

The students will practice using the scientific method. The students and the teacher can perform the experiment during which students use the worksheet to observe, generalize, theorize, and test THE EFFECT OF ENZYMES ON FOOD EXPERIMENT. During a class discussion of student responses, volunteers will diagram and explain their results on the board or in their notebooks.

The students will participate in an experiment to determine WHY FROZEN PEACHES GO MUSHY WHEN THAWED. The students will participate in an experiment to determine HOW TO PREVENT GUACAMOLE FROM TURNING AN UGLY BROWN. The students will participate in an experiment to determine if it is better to CUT OR TEAR LETTUCE FOR A SALAD. The students will participate in a summative evaluation PREVENTION OF ENZYMATIC BROWNING IN FRESH FRUIT activity using raw fruit slices and evaluate the results.

Authors

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